

AND PROGRAMS IN HIGH TEMPERATURE CORROSION RESEARCH

AD 729569

AGARD-R-585-71

AGARD-R-585-71

**AGARD**

ADVISORY GROUP FOR AEROSPACE RESEARCH & DEVELOPMENT

7 RUE ANCELLE 92 NEUILLY SUR SEINE FRANCE

**AGARD REPORT No. 585**

on

**Directory of Organizations,  
Investigators, and Programs  
in**

**High Temperature Corrosion Research**

NORTH ATLANTIC TREATY ORGANIZATION



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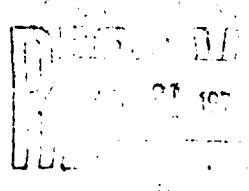
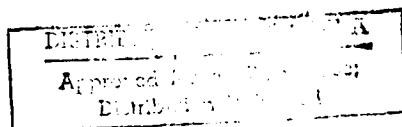
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REF ID: A64657  
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NORTH ATLANTIC TREATY ORGANIZATION  
ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT  
(ORGANISATION DU TRAITE DE L'ATLANTIQUE NORD)

DIRECTORY OF ORGANIZATIONS, INVESTIGATORS, AND PROGRAMS  
IN HIGH TEMPERATURE CORROSION RESEARCH

Prepared for  
The NATO/AGARD Working Group on Basic and Applied  
Research and High-Temperature Corrosion



This Report was sponsored by the Structures and Materials Panel of AGARD.

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Recommending effective ways for the member nations to use their research and development capabilities for the common benefit of the NATO community;

Providing scientific and technical advice and assistance to the North Atlantic Military Committee in the field of aerospace research and development;

Continuously stimulating advances in the aerospace sciences relevant to strengthening the common defence posture;

Improving the co-operation among member nations in aerospace research and development;

Exchanging of scientific and technical information;

Providing assistance to member nations for the purpose of increasing their scientific and technical potential;

Rendering scientific and technical assistance, as requested, to other NATO bodies and to member nations in connection with research and development problems in the aerospace field.

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Published August 1971

620.193:536.45:058.7



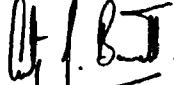
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SUMMARY

This directory of research organizations, investigators, and research programs or areas of research was prepared from information gathered by the NATO/AGARD Working Group on Basic and Applied Research on High-Temperature Corrosion, and the European Federation of Corrosion's Working Group on Corrosion by Hot Gases and Products of Combustion.

The directory lists the organizations, together with the investigators and the research areas (or specific programs) in which they are working, alphabetically by countries. There are 178 organizations from eleven NATO countries included. A category index indicates the high-temperature corrosion research areas in which the various organizations are conducting research. The two research areas currently receiving the most attention are (1) material behavior under corrosion and (2) reaction kinetics and diffusion processes, in which 119 and 97 organizations, respectively, are working. An alphabetical index of investigators includes approximately 240 names.

The AGARD Structures and Materials Panel has an ongoing program of work in this field, organized and coordinated by the Working Group listed on page "v" under the Chairmanship of Mr. T. F. Kearns.

  
Anthony J. Barrett  
Chairman,  
Structures and Materials Panel  
AGARD

## DIRECTORY OF HIGH TEMPERATURE CORROSION RESEARCH

### Organizations, Investigations, and Programs

In recent years increased attention has been devoted to the topic of high temperature oxidation and corrosion of structural alloys as a result of increasing operating temperatures being used in the design of aerospace propulsion systems and airframes. The Advisory Group for Aeronautical Research and Development (AGARD) organized under the North Atlantic Treaty (NATO) set up a Working Group on Basic and Applied Research on High Temperature Corrosion Organization of Aerospace Alloys to Study this important topic. At the request of this Working Group, DMIC prepared this directory of the research organizations and principal investigators active in high temperature corrosion and the topics on which they are working. We believe that the directory affords an overview of work in progress and will aid in the assessment of the distribution of the effort and recognition of gaps and objectives not being effectively pursued.

Information on U. S. and Canadian programs in the directory was obtained by DMIC through a direct mail questionnaire sent in 1970 to researchers who were believed to be active in high-temperature corrosion research. Information on European programs was taken from a 1967 survey of European high-temperature corrosion research conducted by the Working Group on "Corrosion by Hot Gases and Products of Combustion" of the European Federation of Corrosion (EFC). The information selected from the EFC survey was limited to NATO countries\* and to high-temperature corrosion in the categories listed below.

#### Category Index

- 1.1 Thermodynamics, phase diagrams, reaction equilibria
- 1.2 Electrochemical problems
- 1.3 Reaction kinetics and diffusion processes
- 1.4 Aerodynamic factors (mechanism of deposition)
- 1.5 Rheological investigations (viscosity of the melts)
- 2.1 Development of corrosion-resistant materials
- 2.2 Surface protection of materials
- 2.3 Material behavior under corrosion
- 3.1 Additives
- 3.4 Surface treatment of pipes, supports, and other parts of furnaces, boilers, turbines, etc., exposed to high temperature

In the interest of uniformity, these category codes were used in Table 2 of this directory. In addition, when more complete information was not available, these categories were used to indicate the areas, in Table 1, in which research was being conducted by the European laboratories.

(\*) Spain is not within NATO but some laboratories in this Country known to have interests in High Temperature Corrosion work have been included in this directory by courtesy of the Spanish laboratories concerned.

Members of the NATO/AGARD Working Group on Basic and  
Applied Research on High-Temperature Corrosion

T. F. Kearns United States, Chairman  
A. Deruyttere Belgium  
H. V. Kinsey Canada  
J. P. Pouliquenier France  
F. Bollenrath Germany  
A. Griselli Italy  
P. Kofstad Norway  
A. d'Oliveira Sampaio Portugal  
H. P. van Leeuwen Netherlands  
K. A. Rowland United Kingdom  
N. Tallan United States  
R. I. Jaffee U. S., Specialist  
J. Dunham U. K., Liaison, Propulsion  
and Energetics Panel,  
AGARD

Members of the European Federation of Corrosion  
Working Group on Corrosion by Hot Gases  
and Combustion Products

H. Souresny Austria  
H. Zitter "  
M. Caubo Belgium  
Prof. Leclerc "  
Prof. Pourbaix "  
E. Aggernaes Denmark  
Z. Bret Czechoslovakia  
Prof. Tikkonen Finland  
Prof. Bardolle France  
Dr. Manenc "  
K. Lorenz Germany  
W. Möller "  
A. Rahmel "  
W. Schilder "  
Dr. Tuillo Italy  
D. Borgese "  
J. M. N. Jeijersma Netherlands  
Dr. de Jonge "  
P. Kofstad Norway  
S. Feliu Spain  
J. H. González "  
L. O. Härdelius Sweden  
O. Stelling "  
A. Bukowiecki Switzerland  
Th. Geiger "  
M. Heise "  
A. B. Hart United Kingdom  
G. Wood "

TABLE I. DIRECTORY OF ORGANIZATIONS,  
INVESTIGATORS, AND PROGRAMS

- BELGIUM
1. Belgian Center for Corrosion Study, CEBELCOR  
Avenue Paul Héger, Grille 2  
B-1050 Bruxelles  
M. Fourbaix (02) 49.63.96  
A. Pourbaix  
G. vanMuyldae  
Programs:  
1. Preparation of an atlas of chemical and electrochemical equilibria for oxides, hydrides, sulfides, chlorides, hydrates, and other compounds, with special reference to the conditions of stability of protective films  
2. Preparation of diagrams of electrochemical equilibria of materials in the presence of molten salts (carbonates, chlorides, fluorides, sulfates) and in the presence of semiconductive oxides
  2. Centre de Recherches Metallurgiques (C.R.M.)  
rue du Val Benoît, 69  
B-4000, Liege (04) 52.70.50  
A. Davin  
D. Coutsouradis  
L. Habraken  
Programs:  
1. Dry corrosion of superalloys in sulphidizing and carburizing atmospheres  
2. Development of hot corrosion resistant cobalt base alloys  
3. Evaluation of coating stability under hot corrosion conditions
  3. Faculté Polytechnique  
Département de Chimie  
Laboratoire d'Electrochimie  
Rue de l'Epargne  
Mons  
Prof. H. Van der Poorten  
Programs:  
1. Corrosion of refractory metals by molten silicates  
2. Reaction kinetics and diffusion processes  
3. Material behavior under corrosion
  4. Institut Belge des Hautes Pressions  
Sterrebeek  
L. Deffet  
P. Westermans  
Research Areas:  
2.3
  5. Institut de Métallurgie de la Faculté des Sciences Appliquées  
de l'Université Catholique de Louvain  
de Croÿlaan, 2  
3030 Heverlee  
Leuven  
Claude Vanleughem 016/327.47  
Program:  
1. Corrosion of inconel 600 alloy in water vapor at high temperature  
2. Reactions in the system  $\text{Ac}_2\text{O}_3$ - $\text{ThO}_2$ -W and  $\text{La}_2\text{O}_3$ - $\text{ThO}_2$ -W including daughter products Re, Pb, and O. Study of phase diagrams, volatilization, permeability  
3. Reactions in the system  $\text{ThO}_2$ -W-O-Re-Pb  
4. Reactions in the system  $\text{LaN}$ - $\text{AlN}$ -N-W-Ph
5. Steam oxidation of chromium coatings on steel  
6. Hot salt cracking of titanium alloys
  6. Katholieke Universiteit Leuven  
Department Metaalkunde  
3030 Heverlee  
Leuven  
Dr. M. J. Brabers  
Research Areas:  
1.1, 1.3, 2.2, 2.3  
1. Reactions in the system  $\text{Ac}_2\text{O}_3$ - $\text{ThO}_2$ -W and  $\text{La}_2\text{O}_3$ - $\text{ThO}_2$ -W including daughter products He, Pb and O. Study of phase diagrams, volatilization, permeability.  
2. Reactions in the system  $\text{ThO}_2$ -W-O-He-Pb  
3. Reactions in the system  $\text{LaN}$ - $\text{AlN}$ -N-W-Pb  
4. Steam oxidation of chromium coatings on steel  
5. Hot salt cracking of titanium alloys
  7. Laboratoire Belge de l'Industrie Electrique, LABORELEC  
Rhode-Saint-Géry  
G. Taelmans  
Research Areas:  
2.2, 3.4
  8. Laboratoire Central  
Rue de la Discipline  
6060 Gilly  
S. A. Glaverbel (07) 31.01.65  
Programs:  
1. Reaction of alloys with molten salts (silicates)  
2. High temperature coatings development (plasma-spraying and diffusion coatings)  
3. Temperature effects on coatings and intermediate layers
  9. SCK/CEN (Centre D'Etude de L'énergie Nucléaire)  
Metallurgy Department  
2400 Mol  
F. Casteels  
Programs:  
1. Compatibility of W(W-Re) with oxides ( $\text{PbO}$ ,  $\text{WO}_3$ ,  $\text{Bi}_2\text{O}_3$ ,  $\text{ThO}_2$ ,  $\text{La}_2\text{O}_3$ ,  $\text{Ac}_2\text{O}_3$ ,  $\text{BaO}$ , Ba, Pb, Bi) in the temperature range 1500 - 2200 C
- CANADA
10. Atomic Energy of Canada Limited  
Chalk River Nuclear Laboratories  
Materials Science Branch  
Chalk River, Ontario  
B. Cox (613) 687-5581 Ext. 563  
Programs:  
1. Oxidation of zirconium
  11. Ecole Polytechnique  
Département de Génie Métallurgique Chimique  
Division de Métallurgie  
2500 Avenue Marie Guyard  
Montreal, 250, Quebec  
M. Rigaud (514) 739-2451 Ext. 282 or 241  
Programs:  
1. Oxidation of nickel, cobalt, niobium, nickel-cobalt, nickel-niobium alloys  
2. Initial stages of film formation  
3. Spectrophotometric study of products formed during the oxidation of nickel binary alloys Ni-Nb, Ni-Ti, Ni-Al

12. Falconbridge Nickel Mines, Ltd.  
 Metallurgical Laboratories  
 Process and Products Development Group  
 8810 Yonge Street  
 P.O. Box 900  
 Thornhill, Ontario  
 Dr. L. A. Morris
- Programs:
1. Oxidation of austenite stainless steels
  2. Oxidation and hot corrosion of high chromium, nickel-chromium alloys
  3. Sulfidation of high chromium, nickel chromium, alloys
13. McMaster University  
 Department of Metallurgy and Materials Science  
 Hamilton, Ontario  
 Prof. W. W. Smeltzer (416) 522-4971
- Programs:
1. Oxidation properties of zirconium and a zirconium-2.5 w/o niobium alloy
  2. Oxidation-decarburization properties of steels
  3. Thermodynamics of binary alloys and oxygen
  4. Oxidation properties of iron-silicon and nickel-iron alloys
  5. Oxidation properties of nickel
  6. Reactant transport properties in oxide films and scales
  7. Sulfidation properties of nickel-chromium alloys
14. National Research Council of Canada  
 Metallic Corrosion and Oxidation Section  
 Chemistry Division  
 Ottawa 7, Ontario  
 Donald Caplan (613) 993-2318
- Programs:
1. Oxidation of Fe, Ni, Cr: kinetics, effect of pressure, purity, surface preparation, cold work, surface contamination with Si, C, S
  2. Electron-optical characterization of metal surfaces: high energy electron diffraction and X-ray emission analysis of surfaces and their reaction products: Fe, Ni, W, Ta, Si
  3. Initial stages of film formation on Fe, Ni, Si, and W single crystals: nucleation, epitaxy, kinetics, ultrahigh vacuum techniques
  4. Grain structure and cavities in oxide layers
  5. Oxidation of Fe-C alloys
  6. Anodically formed oxides on Fe: kinetics, electrochemistry, electron-optical examination, and autoradiography
  7. Contamination of metal surfaces from hot ceramics; gas phase transport mechanism
15. National Research Council of Canada  
 National Aeronautical Establishment  
 Structures and Materials Laboratory  
 Ottawa, Ontario  
 J. M. Trenouth (613) 993-2812  
 Dr. W. Wallace (613) 993-9280  
 Dr. E. P. Whelan (613) 993-2812
- Programs:
1. Preparation and evaluation of vacuum pack Cr-Ti-Si coatings on B66 alloy (nearing completion)
  2. Oxidation of silicide compounds, diffusion coatings, and binary Nb alloys (being initiated)
  3. Corrosion of silicide coatings by Na<sub>2</sub>SO<sub>4</sub> and NaCl
  4. Oxidation kinetics and breakdown mechanisms in diffusion coated niobium and niobium-base alloys
5. Oxidation kinetics and structural stability of intermetallic compounds
6. Impurity diffusion of Cr, Ti, Si in niobium
7. Oxidation resistance of commercial aluminide coatings on superalloys 713C and IN-100 (recently completed)
16. Orenda Limited  
 Box 6001  
 Toronto International Airport  
 Toronto, Ontario  
 W. Paul (416) 677-3250
- Programs:
1. Evaluation of high-temperature corrosion properties of nickel- and cobalt-base superalloys after long term exposure to straight oxidizing atmospheres
  2. Evaluation of turbine components after long periods of service in Orenda's industrial base turbine engines
  3. Study of the effects of various surface treatments such as shot peening and aluminide coatings
17. Queen's University  
 Centre for Metal and Mineral Technology  
 Chemical Metallurgy Research Group  
 Kingston, Ontario  
 John R. Wilson (613) 547-2816
- Programs:
1. High-temperature corrosion of metallic and refractory materials in oil combustion products (including sulfidation and vanadate corrosion)
  2. High-temperature corrosion of molybdenum in aggressive gaseous environments (mainly halogen gases and hydrogen sulfide)
  3. Corrosion of metallic and refractory materials by molten salts and slags (predominantly the refractory metals by molten fluorides, and commercial refractories by molten oxides)
18. Sherritt Gordon Mines, Ltd.  
 Research and Development Division  
 Fort Saskatchewan, Alberta  
 L. F. Norris (403) 543-2211
- Programs:
1. Improvement of the oxidation resistance of dispersion strengthened nickel-chromium alloys (includes static and dynamic oxidation testing, hot corrosion testing from 1800 - 2200 F)
19. University of Western Ontario  
 Faculty of Engineering Science  
 Materials Science Group  
 London, Ontario  
 C. Roy  
 J. S. Sheasby (519) 679-3302
- Programs:
1. Stress generation during oxidation of zirconium alloys
  2. Effects of growth stresses on oxide morphology for zirconium alloys
  3. High-temperature corrosion resistant coatings for zirconium alloys
  4. Effect of surface orientation of the metal substrate on the oxide film growth
  5. High-temperature oxidation behavior of niobium
  6. Lower oxide formation during oxidation reactions
  7. Electrical properties of oxides during formation on a metal

DENMARK

20. Universität von Kopenhagen, Kemisk Lab. IV  
 Copenhagen  
 N. F. Grönlund  
 Research Areas:  
 1.1, 1.2

FRANCE

21. Centre d'Etudes Nucléaires de Saclay  
 Service de Chimie des Solides  
 Boite Postale N° 6  
 92 Fontenay-aux-Roses  
 R. Darras  
 J. Paidassi  
 Research Areas:  
 1.3
22. Centre National de la Recherche Scientifique  
 15 Rue Georges Urbain  
 94 Vitry-sur-Seine  
 P. Lehr  
 Research Areas:  
 1.1, 2.1, 2.2, 2.3
23. Centre de Recherches Métallurgiques de l'Ecole des Mines  
 60, Boulevard Saint-Michel  
 75 Paris V<sup>e</sup>  
 P. Lacombe  
 G. Beranger  
 Research Areas:  
 1.2
24. Centre de Recherches de la Société Métallurgique d'Imphy  
 Imphy-58  
 P. Legendre  
 Research Areas:  
 2.1, 2.2, 2.3
25. Ecole Centrale des Arts et Manufactures  
 Centre Recherche Physique  
 1 Rue Mongolfier  
 Paris 3<sup>e</sup>  
 Gregoire  
 Research Areas:  
 2.3
26. Ecole des Mines  
 Laboratoire de Chimie-Métallurgie  
 Parc de Saurupt  
 54 Nancy  
 Roux  
 Slama  
 Research Areas:  
 1.1, 1.3
27. Ecole Nationale Supérieure de Chimie de Paris  
 47 Rue des Ecoles  
 75 Paris 5<sup>e</sup>  
 J. Benard (See also #42)  
 J. Oudar  
 Research Areas:  
 1.2, 2.2
28. Ecole Nationale Supérieure Electrochimie et Electrometallurgie  
 39-41 Boulevard Gambetta et Rue Hoche  
 38 Grenoble  
 Besso.  
 Research Areas:  
 1.2, 1.3

29. Forges et Acieries du Saut du Tarn

6 avenue de Messine  
 75-Paris 8eme  
 M. Mailhos  
 Research Areas:  
 2.2

30. Institut de Recherches de la Siderurgie

185 Rue du Président-Roosevelt  
 78 St.-Germain-en-Laye  
 J. Manenc  
 Research Areas:  
 1.3, 2.2

31. Laboratoire de Recherche sur la Réactivité des Solides associés au CNRS

21 Rue Monge  
 21 Dijon  
 P. Barret  
 Research Areas:  
 1.1, 1.3

32. Office National d'Etudes et de Recherches Aérospatiales-ONERA

29, Avenue de la Division Leclerc  
 92 Chatillon-sous-Bagneux  
 P. Gaimiche  
 A. Hivert  
 R. Pichoir  
 G. Slodzian  
 H. Bückle  
 Research Areas:  
 1.1, 1.3, 2.1, 2.2

33. Société Nationale d'Etudes et de Construction de Moteurs Aéronautiques-SNECMA, Laboratoire Central-Usine d'Evry-Corbeil

Boite Postale N° 56  
 91 Corbeil  
 Brunetaud  
 Ferre  
 Research Areas:  
 2.2, 2.3

34. Société Nationale Industrielle Aérospatiale-SNIAS

Laboratoire Central  
 Rue de l'Industrie  
 92 Courbevoie  
 Sertour  
 Research Areas:  
 2.2

35. Société Ugine-Kuhlmann

Laboratoire de Ventron  
 73 Albertville  
 J. P. Givord  
 Research Areas:  
 2.2

36. Trefimetaux G. P.

Département de Recherches Avancées  
 141 Rue Michel Carré  
 95 Argenteuil  
 Syre  
 Molinier  
 Research Areas:  
 2.1

37. Université d'Amiens

College Scientifique  
 18 Place St. Michel  
 80 Amiens  
 F. Marion  
 Programs:  
 1.1, 1.3

38. Université de Lyon  
69 Lyon  
Uzan  
Research Areas:  
1.3
39. Université de Marseille  
Laboratoire de Chimie Générale  
Lab. de Cristallographie  
13 Marseille  
M. Lafitte  
Dreschler  
Research Areas:  
1.1, 1.3, 2.3
40. Université de Nancy  
Laboratoire de Chimie Minérale  
13 Place Carnot  
54 Nancy  
Vigne  
Research Areas:  
1.3, 2.2, 2.3
41. Université d'Orléans  
Labor de Chimie des Solides  
21 Rue Saint-Etienne  
45 Orleans-la-Source  
J. Bardolle  
Research Areas:  
1.1, 1.3
42. Université de Paris  
Lab. de Chimie  
47 Rue des Ecoles  
Paris 5<sup>e</sup>  
J. Benard  
J. Oudar (See also #27)  
Research Areas:  
1.1, 1.3
43. Université de Poitiers  
Laboratoire de Chimie  
5 Cité de la Traverse  
Poitiers  
G. Valensi  
Research Areas:  
1.1, 1.2, 1.3
44. Université de Tours  
Laboratoire Chimie Générale et Minerale  
1 bis Boulevard Tonnellé  
37 Tours  
P. Belin  
Research Areas:  
1.1, 1.3
- GERMANY
45. August Thyssen-Hütte AG  
41 Duisburg-Hamborn  
Kaiser-Wilhelm-Str. 100  
Ch. Strassburger  
Research Areas:  
2.3
46. Babcock-Werke  
Forschung und Entwicklung  
42 Oberhausen  
Postf. 34/35  
H. Jahn  
H. Büskens  
Research Areas:  
2.3
47. Battelle-Institut e.V.  
6000 Frankfurt/Main 90  
Postschliessfach 900/60  
H. Ahlborn  
Programs:  
1. Oxidation resistance of high-temperature  
alloys containing special additions
48. Berliner Kraft- und Licht-AG, BEWAG  
1 Berlin 30  
Stauffenbergstr. 26  
K. Wickert  
Research Areas:  
1.3, 1.5, 3.1
49. Brown, Boveri & Cie  
Zentralstelle für Werkstofftechnik  
68 Mannheim 1  
Postfach 351  
H. Möller  
Research Areas:  
1.1, 1.3, 2.2, 2.3, 3.1, 3.4
50. Dechema-Institut  
6 Frankfurt  
Rheingau-Allee 25  
Dr. A. Rahmel  
Programs:  
1. High-temperature oxidation of iron and steels  
2. Electrochemical studies of corrosion in al-  
kali-sulfate and V<sub>2</sub>O<sub>5</sub> melts.
51. Deutsche Edelstahlwerke AG  
415 Krefeld  
Oberschlesienstr. 16  
Dr. K. Bungardt  
Dr. G. Lennartz  
Research Areas:  
1.3, 2.2, 2.3
52. Edelstahlwerk Witten AG  
581 Witten  
Postfach 1369  
J. Bruch  
Research Areas:  
2.1, 2.3
53. Forschungsvereinigung Verbrennungskraftmaschinen  
6 Frankfurt-Niederrad 1  
Lyoner Strasse  
F. Umland  
W. Möller  
Research Areas:  
1.1, 1.3, 2.1, 2.3, 3.1, 3.4
54. Hamburgische Elektrizitätswerke  
2 Hamburg 1  
Gerhart-Hauptmann-Platz 48  
Pfeiffer  
Research Areas:  
1.1, 1.2, 1.3, 2.3
55. International Nickel Deutschland GmbH  
4 Düsseldorf  
Kreuzstr. 34  
R. Ergang  
W. Herder  
Research Areas:  
2.3
56. Kraftwerk Union AG  
433 Mülheim (Ruhr)  
Postfach 1420  
H. Schieferstein  
Research Areas:  
2.2, 2.3, 3.4

57. L. u. C. Steinmüller GmbH  
 Mat.-Prüfanstalt  
 527 Gummersbach  
 S. Pollmann  
 Research Areas:  
 1.3, 1.5, 2.2, 2.3
58. Mannesmann-Forschungsinstitut GmbH  
 41 Duisburg-Wanheim  
 Schwenk  
 Research Areas:  
 1.2, 1.3, 2.3
59. Max-Planck-Institut für Eisenforschung  
 4 Düsseldorf  
 Max-Planck-Str. 1  
 Bohnenkamp  
 Research Areas:  
 1.2, 1.3, 2.3
60. Max-Planck-Institut für Physikalische Chemie  
 34 Göttingen  
 Bunsenstr. 10  
 Prof. Carl Wagner  
 Research Areas:  
 1.1, 1.2, 1.3
61. Max-Planck-Institut für Metallforschung  
 7 Stuttgart 1  
 Seestr. 75  
 Dr. H. J. Engell  
 H. J. Grabke  
 Research Areas:  
 1.1, 1.2, 1.3, 2.1, 2.2, 2.3
62. Stahlwerke Südwestfalen AG  
 Hüttenfeld  
 5903 Geisweid/Kr. Siegen  
 W. Wesseling  
 F. W. Frantes  
 Research Areas:  
 2.1, 2.3
63. Technischer Überwachungsverein Bayern e.V.  
 8 München 23  
 Kaiserstr. 14  
 K. Köhler  
 Baumann  
 Research Areas:  
 2.2, 2.3
64. Technischer Überwachungsverein Essen e.V.  
 43 Essen  
 Steubenstr. 53  
 Baatz  
 Hermann  
 Research Areas:  
 2.2, 2.3, 3.1
65. Thyssen Röhrenwerke AG  
 Metallurg. Abteilung  
 4 Düsseldorf  
 Höherweg 271 a  
 E. Kranz  
 Research Areas:  
 1.1, 2.1, 2.3
66. Universität Bonn  
 Mineralogisch-Petrologisches Institut  
 53 Bonn 1  
 Lichfrauenweg 3  
 A. Neuhaus  
 N. Gebhardt  
 Research Areas:  
 1.1, 1.3, 2.2, 2.3
67. Universität Dortmund  
 Institut für Physikalische Chemie  
 46 Dortmund  
 August-Schmidt-Strasse  
 H. Ricker  
 Research Areas:  
 1.1, 1.2, 1.3
68. Universität Karlsruhe  
 Institut für Chemische Technik  
 75 Karlsruhe  
 Kaiserstrasse 12  
 Dr. E. Fitzer  
 Programs:  
 1. Formation of  $\text{SiO}_2$  glass layers by oxidation of  $\text{WSi}_2$ ,  $\text{MoSi}_2$ ,  $\text{SiC}$  and  $\text{Si}_3\text{N}_4$ ; kinetics of the oxidation and the oxygen diffusion through the glass as the controlling step  
 2. Kinetics of the reactions of the silicon-donors with base alloys; diffusion of silicon in  $\text{MeSi}_3$ -phases; diffusion of basic alloy components to the oxide-forming layers. The following diffusion couples are studied:  $\text{MoSi}_2/\text{Mo}$ ,  $\text{MoSi}_2/\text{Nb}$ ,  $\text{MoSi}_2/\text{Ta}$ ,  $\text{NbSi}_2/\text{Mo}$ ,  $\text{NbSi}_2/\text{Nb}$ ,  $\text{WSi}_2/\text{Mo}$ ,  $\text{WSi}_2/\text{Nb}$ ,  $\text{WSi}_2/\text{W}$ ,  $\text{MoSi}_3/\text{Ta}_2\text{Si}_3$ ,  $\text{MoSi}_3/\text{Nb}_5\text{Si}_3$ ,  $\text{W}_5\text{Si}_3/\text{Nb}_5\text{Si}_3$ ,  $\text{Ta}/\text{Cr}$ ,  $\text{Nb}/\text{Cr}$ ,  $\text{Ta}/\text{NiCr}$ ,  $\text{Nb}/\text{NiCr}$   
 3. Applied research on the formation of Si-donors on high temperature alloys (for example hot pressing, vapor plating)  
 4. Basic research on reactions of refractory silicides with nitrogen; exploration of such compounds as diffusion barriers on Cr-alloys against nitrogen absorption  
 5. Mechanical properties and recrystallization behavior of  $\text{SiO}_2$ -forming compounds at high temperatures  
 6. Compatibility of  $\text{SiO}_2$  and Si-donors with oxides of the basic alloys; modifications of  $\text{SiO}_2$ -forming compounds by borides and germanides; oxidation kinetics and sintering mechanisms; transport mechanisms in such complex oxides
69. Universität Münster  
 Institut für Metallforschung  
 Lehrstuhl für Anorganische Analytische Chemie  
 44 Münster  
 Schlossplatz 2  
 F. Umland  
 Th. Neumann  
 Research Areas:  
 1.1, 1.2, 1.3, 2.3, 3.1
70. Verein Deutscher Eisenhüttenleute e.V.  
 4 Düsseldorf  
 Breite Str. 27  
 W. Schlüter  
 Research Areas:  
 1.1, 1.2, 2.1, 2.2, 2.3
71. Vereinigung der Grosskesselbetreiber  
 43 Essen  
 Kurfürstenstr. 27  
 H. Kirsch  
 Research Areas:  
 2.3, 3.1
72. Vereinigte Kesselwerke AG  
 4 Düsseldorf  
 Werdener Str. 3  
 Steller  
 Research Areas:  
 2.3, 3.4

ITALY

73. Ansaldo Meccanico Nucleare  
Piazza Garibaldi 2  
Genova  
L. Boselli  
Research Areas:  
1.2, 1.3
74. Centro Sperimentale Metallurgico S.p.A. sezione legale  
Via di Castel, Romano  
Roma  
G. Bando  
Research Areas:  
1.1, 1.2, 2.1, 2.2, 2.3
75. ENIE Nazionale Per l'Energia Elettrica  
Via Giovanni Battista Martini  
Roma  
P. Sturla  
Research Areas:  
2.2, 2.3, 3.1, 3.4
76. Istituto Metalli Leggeri-Comitato Corrosioni  
Via S. Giovanni sul Muro n. 9  
Milano  
Rossi  
Research Areas:  
2.3
77. Laboratorio FIAI  
Stabilimento Grandi Motori  
Corso G. Agnelli 200  
Torino  
C. Simonetti  
Research Areas:  
2.3
78. SNAM Progetti  
Laboratorio Rinuti Studi e Ricerche  
S. Donato Milanese  
Milano  
C. Verga  
Research Areas:  
2.3
79. Università di Bologna  
Istituto di Metallurgia  
Viale Risorgimento, 4  
Prof. Paolo Spinedi  
Programs:  
1. Oxidation of metals in dry oxygen by means of spectrometric and thermogravimetric methods
80. Università di Pisa  
Istituto di Chimica Industriale e Applicata  
Pisa  
M. Baccaredda  
Research Areas:  
1.3

NETHERLANDS

81. Laboratory for Thermal Power Engineering  
Group Combustion Technology and Steamboilers  
Rotterdamseweg 139A  
Delft  
H. van Staai  
Programs:  
1. Studies of the formation and suppression of V<sub>2</sub>O<sub>5</sub>-corrosion in fuel-oil fired steamboilers

N.V. tot Keuring van Electrotechnische Materialen (N. V. KEMA)

Vianen  
J. H. N. Jelgersma  
A. J. Elshout

Research Areas:  
1.1, 2.3, 3.1

Technische Hogeschool Twente

P.O. Box 217  
Enschede  
P. J. Gellins

Research Areas:  
1.1, 1.3, 2.3

NORWAYNorges Tekniske Høgskole - NTH

Dep. of Metallurgy  
Trondheim  
A. B. Winterbottom

Research Areas:  
1.1, 1.3

Sentralinstitutt for Industriell Forskning - SI

Blindern  
Oslo 3  
Forskningsveien 1  
P. Kofstad  
J. Kvernes

Research Areas:  
1.1, 1.2, 1.3, 2.1, 2.2, 2.3

SPAINCelulosas De Huelva, S.A. Madrid

M. R. Ortega  
Research Areas:  
2.3, 3.1, 3.4

Compañia Iberica Rafinadora De Petroleos, S.A.

Madrid  
Research Areas:  
2.1, 2.3, 3.1, 3.4

Esso Petroleos Espanoles, S.A.

Madrid  
L. A. Lopez  
M. A. Quintana  
Research Areas:  
2.1, 2.3, 3.1, 3.4

La Maquinista Terrestre y Maritima, S.A.

Barcelona  
Research Areas:  
2.3, 3.1, 3.4

UNITED KINGDOMAdmiralty Materials Laboratory

Holton Heath  
Poole  
Dorset  
BH16 6JU  
J. F. Conde Lytchett Minster 711  
Programs:  
1. Study of the phenomenon and mechanism of high temperature sulfidation corrosion in marine gas turbines  
2. Studies of alloys and coatings using a low pressure combustion rig  
3. Kinetic and other basic investigations

91. Associated Octel Co. Ltd.  
Research and Engineering Dept.  
P. O. Box 17  
Ellesmere Port  
Cheshire  
W. E. Cowley  
Research Areas:  
2.1, 2.3
92. Atomic Energy Research Establishment  
Harwell  
Didcot  
Berks  
Dr. J. E. Antill Abingdon 4141 Ext. 4454  
Programs:  
1. Kinetics of the corrosion of metals and ceramics by gases. Particular interests include carburization phenomena and generation of stress by corrosion.  
1.1, 2.1, 2.3
93. Babcock, Wilcox (Operations) Ltd.  
High Street  
Renfrew  
Scotland  
G. G. Foster  
Research Areas:  
2.3
94. Berkeley Nuclear Lab., C.E.G.B.  
Materials Div.  
Berkeley  
Gloucestershire  
P. P. Jennings  
Research Areas:  
1.1, 1.2, 1.3, 2.1, 2.2, 2.3
95. British Steel Corp.  
Midland Group, Research and Development Dep.  
Swinden Laboratories  
Moorgate,  
Rotherham  
A. Nicholson  
A. M. Edwards  
Research Areas:  
1.1, 2.3
96. Brown-Firth, Research Lab.  
Attercliffe Road  
Sheffield S 4 7VY  
J. E. Truman  
Research Areas:  
2.3
97. Central Electricity Research Lab., C.E.G.B.  
Kelvin Avenue  
Leatherhead  
Surrey  
A. B. Hart  
D. de G. Jones  
D. R. Holmes  
W. D. Halstead Leatherhead 4488  
Programs:  
1. Thermodynamic studies of high temperature corrosion processes  
2. Vapor and decomposition pressures of alkali metal sulfates; their vapor and condensed phase reactions. Also those of Fe, Cr, and Ni sulfates, sulfides, V oxides, and mixed sulfates of the type  $\text{Na}_3\text{Fe}(\text{SO}_4)_3$ .  
Research Areas:  
1.2, 1.4, 1.5, 2.1, 2.2, 2.3, 3.4
98. The City University  
St. John Street  
London EC 1  
A. C. C. Tseung  
Research Areas:  
1.3, 2.3
99. Cranfield Institute of Technology (Ex. Glasgow University)  
Department of Materials  
Cranfield  
Bedfordshire  
Dr. P. Hancock 0234 51551  
Programs:  
1. Mechanical properties of surface oxides  
2. Influence of surface scales on mechanical properties of underlying metals  
3. Effect of gaseous contamination on scaling
100. Fulmer Research Institute Ltd.  
Stoke Poges  
Buckinghamshire  
M. A. P. Dewey Fulmer 2181  
Programs:  
1. Development of oxidation and sulfidation resistant cobalt and nickel alloys  
2. Mechanism of sulfidation attack  
3. Physical chemistry of sulfidation
101. Henry Wiggin & Co. Ltd.  
Hereford  
Dr. J. Heslop Hereford 6461  
Programs:  
1. High-temperature alloy development  
2. Gaseous corrosion
102. Hirst Research Centre, G.E.C. Ltd.  
East Lane  
North Wembley  
Middlesex  
D. S. Evans  
Research Areas:  
1.1, 1.2, 1.3, 2.1, 2.3
103. International Combustion Ltd.  
Derby, DE 2, 9 GT  
Ashley  
Research Areas:  
2.1, 2.3
104. International Nickel Ltd.  
Research and Development Lab.  
Wiggin Street  
Birmingham 16  
E. G. Richards  
Henry Lewis  
R. A. Smith 021-454-4871  
Programs:  
1. Development of new alloys resistant to high-temperature corrosion  
2.3
105. University of Leeds  
Dep. Metallurgy  
The Houldsworth School of Applied Science  
Leeds 2  
J. C. Scully  
Research Areas:  
1.3
106. University of Liverpool  
Dep. Metallurgy and Materials Science  
P. O. Box 147  
Liverpool L693BX

- Prof. John Stringer                    051-709-6022  
 Programs:  
 1. Oxidation of tantalum, niobium, and dilute alloys based on these metals  
 2. Oxidation and sulfidation of cobalt-base superalloys  
 3. Scale fracture mechanisms  
 4. Morphologies of oxide scales  
 5. Stress generation and relief in growing oxide scales
107. University of Manchester  
 Institute of Science and Technology  
 Chem. Eng.  
 P. O. Box No. 88, Sackville St.  
 Manchester M60 1QD  
 1. K. Ross  
 G. C. Wood                            061-236 3311  
 I. A. Menzies                        061-236 3311  
 Programs:  
 1. Kinetics, nucleation and growth; structure of oxide scales  
 2. Oxidation under wear conditions  
 3. Stress and hardness measurements  
 4. Cyclic oxidation  
 5. Cr and Al diffusion coatings  
 6. Mechanical properties of oxides  
 7. Sulfidation of Ni-based alloys
108. University of Manchester  
 Institute of Science and Technology  
 Metallurgy  
 P. O. Box No. 88, Sackville St.  
 Manchester M60 1QD  
 R. Rolls  
 Research Areas:  
 1.3, 2.2, 2.3
109. Marchwood Eng. Lab., C.E.G.B.  
 Marchwood  
 Southampton  
 Hants  
 P. J. Jackson  
 Research Areas:  
 2.3, 3.1
110. Midlands Region, C.E.G.B.  
 Scientific Services Department  
 Hams Hall  
 Birmingham  
 L. H. Toft  
 Research Areas:  
 2.3, 3.4
111. National Gas Turbine Establishment  
 Frestock  
 Farnborough  
 Hants  
 A. Burwood-Smith  
 J. I. Northwood  
 M. J. Weaver  
 Programs:  
 1. Effect of alloy composition and microstructure on oxidation
112. National Physical Laboratory  
 Teddington  
 Middlesex  
 G. O. Lloyd                        01-977 3222  
 Programs:  
 1. Microstructural studies of breakaway oxidation on chromium-iron alloys  
 2. Hot salt corrosion of nickel-based superalloys
113. University of Newcastle Upon Tyne  
 Dep. Metallurgy  
 Newcastle-upon-Tyne, 1  
 R. F. Tylecote  
 D. Maxwell  
 Research Areas:  
 1.3
114. Nuclear Design and Construction Ltd.  
 Cambridge Road  
 Whetstone  
 Leicester  
 D. Goodison  
 Research Areas:  
 1.3, 2.2, 2.3, 3.1, 3.4
115. N. W. Region, C.E.G.B.  
 Scientific Services Department  
 825 Wilmslow Road  
 East Didsbury  
 Manchester  
 M. Fountain  
 Research Areas:  
 1.2, 2.2, 2.3, 3.1
116. Rolls Royce Ltd.  
 Bristol Engine Division  
 P. O. Box 3  
 Filton  
 Bristol  
 G. Llewellyn  
 D. W. Hall  
 Research Areas:  
 2.2, 2.3
117. University of Sheffield  
 Dep. Metallurgy  
 St. George's Square  
 Sheffield S13JD  
 Dr. N. Birks                        78555  
 Programs:  
 1. Oxidation of metals and alloys in complex alloys
118. Shell Research Ltd.  
 Thornton Research Centre  
 P. O. Box 1  
 Chester  
 R. W. Wilson  
 Research Areas:  
 1.2, 1.3, 2.2, 2.3, 3.1, 3.4
- UNITED STATES
119. Aerospace Research Laboratories  
 Metallurgy and Ceramics Research Laboratory  
 Building 450 (ARZ)  
 Wright-Patterson Air Force Base, Ohio 45433  
 Dr. N. M. Tallan                    (513) 255-4402  
 Dr. H. C. Graham  
 Programs:  
 1. Oxidation of ZrB<sub>2</sub>, ZrB<sub>2</sub>-SiC, and ZrB<sub>2</sub>-SiC-C compositions  
 2. Oxidation of dispersion-strengthened Ni-Cr alloys  
 3. Oxidation/vaporization of Cr<sub>2</sub>O<sub>3</sub>  
 4. Effect of rare earth additions on oxidation of Ni-Cr-Al alloys  
 5. Oxidation of coated columbium-based alloys  
 6. High temperature oxidation of alloys containing Mo and/or W  
 7. Sulfidation and hot corrosion  
 8. Diffusion in oxide scales.

120. AiResearch Manufacturing Company of Arizona  
 Division of The Garrett Corp.  
 402 South 36th Street  
 Phoenix, Arizona 85034  
 M. S. Roush (602) 267-2650  
 Programs:  
 1. Evaluation of seven commercial protective coatings for resistance to hot corrosion  
 2. Investigation of repair of diffusion coatings on turbine components  
 3. Investigation of the relative hot-corrosion resistance of uncoated and coated IN-738, IN-792, MAR-M 432, MAR-M 509, as compared with IN-100 and Alloy 713LC
121. Air Force Institute of Technology  
 Civil Engineering School  
 Wright-Patterson Air Force Base, Ohio 45433  
 Dr. James R. Myers (513) 255-3569  
 Programs:  
 1. Coatings for superalloys in gas turbine engines  
 2. Oxidation of ultra-pure cobalt at selected oxygen pressures over the temperature range 950 - 1250 C  
 3. The oxidation of René 41 and thoriated nickel filaments
122. Avco Corporation  
 Systems Division  
 Materials Sciences Dept.  
 Lowell Industrial Park  
 Lowell, Massachusetts 01851  
 Dr. Warren C. Steele (617) 452-8961  
 Programs:  
 1. Kinetics of gas-surface reactions (Reactions of refractory metals or coated metals with high temperature air species)  
 2. Graphite oxidation
123. Avco Lycoming Division  
 Materials Laboratories Dept.  
 550 So. Main Street  
 Stratford, Connecticut 06497  
 Dr. William R. Freeman, Jr. (203) 378-8211  
 Programs:  
 1. Evaluation of promising sulfidation resistant nickel-base superalloys  
 2. Effect of time, sulfur content, NaCl content, temperature, and alloy composition on depth of attack  
 3. Effect of vanadium and NaCl on corrosion rate
124. Battelle Memorial Institute  
 Columbus Laboratories  
 505 King Avenue  
 Columbus, Ohio 43201  
 Dr. R. I. Jaffee (614) 299-3151 Ext. 1536  
 E. S. Bartlett (614) 299-3151 Ext. 2873  
 Dr. B. A. Wilcox (614) 299-3151 Ext. 2360  
 Programs:  
 1. Oxidation of superalloys, particularly cobalt-base alloys, and dispersion strengthened nickel-base alloys, such as TD NiC and TD NiCrAl  
 2. Studies on the effects of ThO<sub>2</sub> and rare earth metals and their oxides on oxidation mechanisms in nickel and cobalt alloys  
 3. Diffusion studies of metals in oxides and alloys Cr<sup>+3</sup> in NiO and NiCr and Al<sup>+3</sup> in TD NiCrAl alloys  
 4. Creep in oxides  
 5. Plasticity in scales  
 6. Oxidation of tantalum, columbium, and their alloys  
 7. Evaluation of coated refractory materials
125. Bell Telephone Laboratories  
 Dept. of Metallurgical Engineering  
 Room 1A-106  
 Murray Hill, New Jersey 07974  
 Dr. J. H. Swisher (201) 582-4601  
 Programs:  
 1. Internal oxidation as a means of dispersion strengthening alloys for high-temperature cations  
 2. Surface oxidation of Ni-Fe alloys containing small Si and Mn additions. Controlled surface oxidation required for electrical contacts  
 3. Corrosion in thin film metallization
126. Bendix Research Laboratories  
 Materials and Processes Dept.  
 16-1/2 Mile Road  
 Southfield, Michigan 48075  
 S. K. Rhie (313) 352-7630  
 Programs:  
 1. Oxidation of commercial high-temperature alloys
127. Bureau of Mines  
 Materials Science Projects  
 Albany Metallurgy Research Center  
 P.O. Box 70  
 Albany, Oregon 97321  
 Dr. Arne Landsberg (503) 926-5811  
 Dr. Laurance L. Oden (503) 926-5811  
 Programs:  
 1. Chlorination of gold  
 2. Chlorination of platinum  
 3. Chlorination of tungsten, molybdenum and their binary alloys  
 4. Materials for construction of high temperature chlorinators (under which title the corrosion of the alkaline earth fluorides in typical industrial chlorination environments was investigated)
128. Cabot Corporation  
 Stellite Division  
 Technology Dept.  
 1020 W. Park Avenue  
 Kokomo, Indiana 46901  
 Dr. S. T. Wiodek (317) 457-8411 Ext. 624  
 Programs:  
 1. Development of high strength Ni- and Co-base alloys with good oxidation/hot corrosion resistance  
 2. Evaluation of commercial Ni- and Co-base alloys in oxidation/heat corrosion  
 3. Development of alloys for carbonizing/oxidizing service  
 4. Processing techniques for highly alloyed oxidation resistant compositions
129. Clemson University  
 College of Engineering  
 Clemson, South Carolina 29631  
 Dr. James S. Wolf  
 Programs:  
 1. The role of self-generated scale stresses in the high-temperature oxidation of metals

130. Connecticut, University of  
Department of Metallurgy  
Storrs, Connecticut 06268  
Dr. J. F. Deveraux (203) 429-3311 Ext. 1273  
Prof. N. D. Greene (203) 429-3311 Ext. 1273  
Programs:  
1. Effect of oxide contaminants on oxidation of silicon  
2. Oxidation of lanthanide metals
131. Curtiss-Wright Corporation  
Materials Engineering Dept.  
One Passaic Street  
Wood-Ridge, New Jersey 07075  
Mr. Sam Wolsin (201) 777-2900 Ext. 2709  
Programs:  
1. Evaluation of diffusion coatings for Udimet 700  
2. Evaluation of diffusion coatings for IN-100  
3. Evaluation of the relative oxidation-hot corrosion resistance of selected nickel- and cobalt-base superalloys  
4. Development of improved diffusion coatings for nickel- and cobalt-base superalloys
132. Dayton, University of  
Research Institute  
High Temperature Materials Engineering Group  
Dayton, Ohio 45409  
Dr. Dennis Gerdean (613) 229-2517  
Programs:  
1. Creep of coated and uncoated Ta-222 (current)  
2. Repairability of slurry silicide coatings (inactive)
133. Delaware, University of  
Department of Chemical Engineering  
Newark, Delaware 19711  
Prof. C. L. Birchenall  
Programs:  
1. Diffusion of Fe<sup>55</sup> in Cr<sub>2</sub>O<sub>3</sub>  
2. Self-diffusion of iron in ferrous sulfide
134. Denver, University of  
Metallurgy and Materials Science Division  
Denver Research Institute  
University Park  
Denver, Colorado 80210  
Dr. Albert S. Yamamoto (303) 753-2621  
Programs:  
1. Development of Ni-Cr-W alloys with emphasis on improved oxidation and sulfidation resistance (recently completed)
135. Florida, University of  
Dept. of Metallurgical and Materials Engineering  
Center for Applied Thermodynamics and Corrosion  
Gainesville, Florida 32601  
F. N. Rhines (304) 392-1451  
F. R. Verink (304) 392-1451  
Programs:  
1. Oxidation of nickel  
2. Surface films
136. Ford Motor Company  
Materials Development Dept.  
Turbine Operations  
20000 Rotunda Drive  
Dearborn, Michigan 48121  
Yesta P. Jelang (313) 32-31612  
Warren A. Rentz (313) 33-75316  
Programs:  
1. Development of high-temperature nickel- and cobalt-base alloys and determination of their properties  
2. Improved sulfidation resistant coatings for nickel-base alloys
137. General Electric Company  
Materials and Processes Laboratory  
Schenectady, New York 12305  
Dr. Chester T. Sims (518) 374-2211  
Ext. 5-3079, 5-9223  
Gerald Wasielewski  
Programs:  
1. Development of nickel- and cobalt-base alloys for industrial gas turbines  
2. Correlation of oxidation/corrosion test data with service life for superalloys and steels  
3. Development of hot-corrosion resistant alloys for marine gas turbines (Navy/MEL)  
4. Study of fuel treatments for residual fuels  
5. Materials developments for hot-stage use in residual fuel marine industrial turbines
138. General Electric Company  
Material and Process Technology Laboratories  
Thomson Laboratory  
1000 Western Ave.  
Lynn, Massachusetts 01905  
Dr. M. Kaufman (617) 594-5156  
E. J. Beltran  
Programs:  
1. Hot corrosion behavior of nickel- and cobalt-base superalloys and protective coatings in simulated marine and industrial environments
139. General Electric Company  
Oxidation/Corrosion Laboratory  
Materials Development Engineering  
Gas Turbine Department #53-337  
Schenectady, New York 12305  
Harvey von E. Doering (518) 374-2211  
Ext. 54311  
Programs:  
1. Development of high temperature (1400 - 2000 oxidation data for design properties  
2. Evaluation of nickel- and cobalt-base alloys and coatings in crude and residual fuels  
3. Evaluation of nickel- and cobalt-base alloys and coatings in hot corrosion  
4. Evaluation of corrosion inhibiting additives for vanadium bearing fuels
140. General Electric Company  
Research and Development Center  
Metallurgy and Ceramics Laboratory  
P.O. Box 8  
Schenectady, New York 12301  
Dr. C. S. Tedmon Jr. (518) 346-8771  
Dr. H. S. Spacil (518) 346-8711  
Dr. Alan U. Seybolt (518) 346-8771  
Programs:  
1. Thermodynamics and kinetics of corrosion of gas turbine alloys burning impure fuel  
2. Research on mechanisms of hot corrosion
141. General Electric Company  
Materials and Process Technology Laboratory  
Aircraft Engine Group  
Building 500-M87  
Cincinnati, Ohio 45215  
Dr. William C. Hagel  
C. S. Wukusick  
Programs:  
1. Hot corrosion and oxidation of superalloys
142. General Electric Company  
Materials and Processes Laboratory  
Aircraft Engine Group  
Evendale, Ohio 45218  
Dr. R. E. Allen (513) 243-6738

**Programs:**

1. Strengthening of FeCrAlY oxidation resistant alloys
2. The influence of high velocity (Mach 0.5-1.0) gases on surface stability in high-temperature alloys
3. Oxidation resistance and coating development for high strength Cr alloys
4. Coating development for TD NiCr
5. The influence of small quantities of rare earth elements on the oxidation resistance of Ni-base superalloys

**143. IIT Research Institute**

Metals Division  
10 West 35th Street  
Chicago, Illinois 60616  
Dr. V. L. Hill (312) 225-9630

**Programs:**

1. Development of oxidation-resistant hafnium-base alloys (current)
2. Investigation of refractory metal composites for liquid rocket engines (oxidation-corrosion in O<sub>2</sub>, F<sub>2</sub>, HF, BF<sub>3</sub> and their combinations) (current)
3. Ductile claddings for dispersion-strengthened nickel-base alloys (oxidation of Ni-Cr-Al-Y, Ni-Cr-Ta-Y, and Fe-Cr-Al-Y Alloys) (Completed)

**144. The International Nickel Company, Inc.**

Paul D. Merica Research Laboratory  
Materials Systems Section  
Sterling Forest  
Suffern, New York 10501  
Dr. J. W. Schultz (914) 735-2761

**Programs:**

1. Improved test methods for hot-corrosion and oxidation
2. Effects of alloy composition on hot corrosion and oxidation resistance of nickel-base alloys

**145. Little, A. D., Inc.**

R&D Division, Materials Section  
Cambridge, Massachusetts 02140  
Dr. Joan B. Berkowitz (617) 864-5770 Ext. 2913

**Programs:**

1. Effects of electric fields on hot corrosion in conducting flames

**146. Lockheed Missiles & Space Company**

Palo Alto Research Laboratories  
Metallurgy and Composites, D/S2-31, B/204  
3251 Hanover Street  
Palo Alto, California 94304

Dr. T. E. Tietz (415) 324-3311 Ext. 45678  
R. A. Perkins (415) 324-3311 Ext. 45740  
C. M. Packer (415) 324-3311 Ext. 45286

**Programs:**

1. Stability characterization of refractory materials under high velocity flight conditions (Air Force)
2. Nitridation resistant chromium alloys (NASA)
3. Coatings for tantalum alloys (NASA)
4. Environmental stability of high temperature alloys (IR&D)

**147. Los Alamos Scientific Laboratory**

Group N-1  
P.O. Box 1663  
Los Alamos, New Mexico 87544  
Dr. R. J. Fries (505) 667-6322

**Programs:**

1. Chemical diffusion coefficients of carbon in the Group VI refractory metals as determined from carbide layer growth rates
2. Carbide layer growth rates of W/Mo and W/Re alloys
3. Evaporation rates of refractory metals

**148. Manlabs, Inc.**

21 Erie Street  
Cambridge, Massachusetts 02139  
Dr. L. Kaufman

**Programs:**

1. Stability characterization of refractory materials under high velocity atmospheric flight conditions
2. Development of boride composites for oxidation resistant components

**149. Massachusetts Institute of Technology**

Corrosion Laboratory  
Room 8-202  
Cambridge, Massachusetts 02139  
Prof. Herbert H. Uhlig (617) 864-6900 Ext. 5315

**Programs:**

1. Initial oxidation of single crystal copper (150-250 °C)

**150. Michigan, University of**

Department of Chemical and Metallurgical Engineering  
Ann Arbor, Michigan 48104  
Prof. Lawrence H. Van Vlack (313) 764-2385

**Programs:**

1. Oxide subscales in binary iron alloys
2. Scale and subscale formation in alloys of iron with Group VIIB elements

**151. NASA-Lewis Research Center**

Coating Section, 49-1  
21000 Brookpark Road  
Cleveland, Ohio 44135  
Salvatore J. Grisaffee (216) 433-4000 Ext. 393

**Programs:**

1. Pack and slurry coatings for superalloys and dispersion strengthened materials
2. Alloy claddings for superalloys and dispersion-strengthened metals
3. Oxidation behavior of coatings and metal claddings
4. Characterization of coatings and metal claddings
5. Development and evaluation of slurry coatings for refractory metals
6. Coatings for high performance rocket engines
7. Hot corrosion of alloys

**152. NASA Lewis Research Center**

Oxidation and Refractory Compounds Section, 49-1  
21000 Brookpark Road  
Cleveland, Ohio 44135  
Dr. H. B. Probst (216) 433-4000 Ext. 267

**Programs:**

1. Oxidation of TD Nickel-Chromium  
Surface preparation effects  
Velocity effects  
Pressure effects  
Scale topology  
Hot corrosion
2. Oxidation mechanisms and kinetics in the Ni-Al, Ni-Al-Cr, Ni-Al-Ti, and Ni-Al-Si systems
3. Simulated turbine engine oxidation of commercial cast Ni-base superalloys
4. Vaporization of protective scales

5. Cyclic oxidation of Cr<sub>2</sub>O<sub>3</sub> and Al<sub>2</sub>O<sub>3</sub> forming alloys  
 6. Properties of spinels  
 7. Coating and cladding studies
153. National Bureau of Standards  
Corrosion Section  
 Washington, D. C. 20234  
 Dr. J. Kruger (301) 921-2094  
 Programs:  
 1. Surface reactions and initial film formation
154. Naval Air Development Center  
 Mechanical Metallurgy Branch (MAMM-4)  
 Metallurgical Division  
 Aero Materials Department  
 Warminster, Pennsylvania 18974  
 Robert G. Mahorter (215) 672-9000 Ext. 2808  
 Programs:  
 1. Analyses of parts from engines subjected to naval aircraft service to determine the extent and severity of oxidation/corrosion problems  
 2. Studies of surface reaction kinetics with the objective of minimizing scale formation on heat resisting alloys  
 3. Development of NDT methods for detecting incipient hot corrosion
155. Naval Ship Research and Development Laboratory  
 Metals and Composites Division  
 Code A815  
 Annapolis, Maryland 21402  
 Walter L. Wheatfall, Sr. (301) 268-7711  
 Ext. 8205  
 Programs:  
 1. Hot corrosion behavior of recently developed nickel-base alloys in combustion products from diesel fuel  
 2. Oxidation behavior of nickel-base superalloys  
 3. Development of dispersion-strengthened cobalt-base alloys  
 4. Effect of fuel additives on hot-corrosion behavior of materials in combustion products of vanadium-bearing fuels plus ingested sea salt  
 5. Effect of alloying elements on hot-corrosion behavior of nickel-base alloys  
 6. Mechanism of hot corrosion
156. New York, State University of  
 Dept. of Materials Science  
 College of Engineering  
 Stony Brook L. I., New York 11790  
 Prof. L. Seigle  
 Programs:  
 1. Mechanism of oxidation of Ni-Al alloys
157. North American Rockwell Corp.  
 Science Center  
 Thousand Oaks, California 91360  
 Dr. Neil Paton (805) 498-4545  
 Programs:  
 1. Oxidation of thorium-dispersed nickel-base alloys  
 2. Hot salt stress corrosion of superalloys
158. Northwestern University  
 Department of Materials Science  
 The Technological Institute  
 Evanston, Illinois 60201  
 Prof. J. Bruce Wagner, Jr.  
 Programs:  
 1. The diffusion of sulfur and also the diffusion of chlorine in single crystals of oxides
159. The Ohio State University  
 Dept. of Metallurgical Engineering  
 116 W. 19th Avenue  
 Columbus, Ohio 43210  
 Prof. Robert A. Rapp (614) 293-6178  
 Programs:  
 1. Oxidation of Ni-Cr-Al alloys at 1000-1200 C  
 2. Solubility and diffusivity of oxygen in solid nickel  
 3. Diffusion of chromium in nickel oxide  
 4. Control of oxygen activity in gaseous environments
160. Olin Corporation  
 Metals Research Laboratories  
 91 Shelton Avenue  
 New Haven, Connecticut 06511  
 Dr. M. J. Pryor  
 Programs:  
 1. High-temperature oxidation of copper-base alloys
161. Pennsylvania State University  
 Metallurgy Section  
 M. I. Building  
 University Park, Pennsylvania 16802  
 Prof. G. Simkovich (814) 865-3351  
 Programs:  
 1. Sulfidation of binary and ternary iron-base alloys  
 2. Oxidation of chromium-base alloys  
 3. Oxidation of cast irons  
 4. Oxidation and sulfidation of pure metals  
 5. Oxidation and simultaneous carburization of pure metals and alloys  
 6. Effect of gas solubilities in scales upon kinetics of oxidation and sulfidation
162. Pennsylvania, University of  
 School of Metallurgy and Materials Science  
 Philadelphia, Pennsylvania 19104  
 Prof. W. L. Worrell (215) 594-8592  
 Programs:  
 1. Kinetics of dissociation of H<sub>2</sub>S(g) on iron sulfide (FeS) at elevated temperatures  
 2. Nitridation of titanium at temperatures between 1200 and 1500 C  
 3. High-temperature corrosion of chromium and chromium-nickel alloys in SO<sub>2</sub>/O<sub>2</sub> atmospheres
163. Phillips Petroleum Company  
 Research and Development Dept.  
 Phillips Research Center, Bldg. C-7  
 Bartlesville, Oklahoma 74003  
 R. M. Schirmer (918) 336-6600 Ext. 48-573  
 Programs:  
 1. Effect of sulfur in JP-5 fuel on hot corrosion of turbine blade materials in marine environment  
 2. Evaluation of protective coatings for resistance to hot corrosion  
 3. Effect of smoke-abatement additives in JP-5 fuel on hot corrosion of turbine blade materials  
 4. Development of turbine simulator for hot corrosion studies  
 5. Inhibition of hot corrosion of superalloys by fuel additives  
 6. Effect of pressure on hot corrosion of superalloys  
 7. Effect of vanadium in fuel on hot corrosion of superalloys  
 8. Effect of lead in fuel on hot corrosion of superalloys

164. Pratt & Whitney Aircraft  
 Division of United Aircraft Corp.  
 Advanced Materials Research and Development  
 Laboratory  
 Middletown, Connecticut 06457  
 Dr. F. S. Pettit (302) 347-4401 Ext. 3189  
 Dr. G. W. Goward (302) 347-4401 Ext. 3189  
 Pratt & Whitney Aircraft Div.  
 East Hartford, Conn.  
 Dr. D. H. Boone  
 Programs:  
 1. Oxidation and hot corrosion ( $\text{Na}_2\text{SO}_4$ , etc.) of nickel- and cobalt-base alloys--development of more resistant alloys  
 2. Protective coatings for nickel- and cobalt-base alloys  
 3. Oxidation of uncoated and coated columbium-base alloys
165. Purdue University  
 School of Materials Science and Metallurgical Engineering  
 Lafayette, Indiana 47907  
 Prof. Richard E. Grace (317) 749-2601  
 Programs:  
 1. Transition kinetics during linear to parabolic oxidation of chromium (recently completed)  
 Oxidation-sulfidation kinetics of iron (current)
166. Solar Division  
 International Harvester Company  
 Process Research Dept. (Mail Zone R-1)  
 2200 Pacific Highway  
 San Diego, California 92112  
 A. R. Stetson  
 Programs:  
 1. Castings for dispersion strengthened alloys--NAS3-14312  
 2. Fused slurry silicide coatings for Ta reentry heat shields--NAS3-14315  
 3. Evaluation of coatings for cobalt- and nickel-base superalloys--NAS3-9401  
 4. Silicide coatings for tantalum and columbium alloys--NAS3-9412 and NAS3-7276 (NASA CR-72519 and NASA CR-54529)  
 5. Hot corrosion of coated superalloys in a gas turbine environment, Contract No. N00019-68-C 0532 (Naval Air System Command AIR 53674)
167. Stanford Research Institute  
 Materials Sciences Laboratory  
 Menlo Park, California 94025  
 Dr. Daniel D. Cubicciotti (415) 326-6200  
 Programs:  
 1. Volatilization of metal oxides and thermodynamics of oxides  
 2. Hot salt corrosion  
 3. Reactions with salts and oxides
168. Stanford University  
 Mineral Engineering Dept.  
 Stanford, California 94305  
 Prof. R. W. Bartlett (415) 321-2500 Ext. 4470  
 Programs:  
 1. Solubility and diffusion of oxygen in platinum and the effect of other metals in platinum alloys on both internal oxidation and oxygen transport. The end applications are related to high temperature coatings based on platinum group metals. (current)
169. Sylvania Electric Products, Inc.  
 Chemical and Metallurgical Division  
 High Temperature Composites Laboratory  
 70 Cantiague Road
- Hicksville, New York 11802  
 Lawrence Sama (516) 931-3500  
 Programs:  
 1. Development of protective coatings for columbium alloy gas turbine blades  
 2. Scale-up of fused silicide coatings for columbium alloy reentry heat shields
170. Systems Research Laboratories, Inc.  
 Physical Sciences Division  
 7001 Indian Ripple Road  
 Dayton, Ohio 45440  
 Dr. W. C. Tripp (513) 426-6000  
 Programs:  
 1. Electrical behavior of ceramic materials at high temperatures (includes study of defect structure and high temperature oxidation of metals and alloys)
171. TRW, Inc.  
 Equipment Group  
 23555 Euclid Avenue  
 Cleveland, Ohio 44117  
 Dr. J. V. Peck (216) 383-2967  
 Dr. R. J. Quigg  
 Programs:  
 1. Aluminide coatings on superalloys  
 2. Non-aluminide coatings for superalloys  
 3. Coatings for columbium  
 4. Basic corrosion of superalloys  
 5. Development of production manufacturing techniques for coating Ti-Ni  
 6. Development of repair and reprocess coating for Ni-base alloy turbine blades  
 7. Development of improved coatings for Ni- and Co-base alloys  
 8. Manufacturing techniques for W/Si-W coated tantalum
172. United Aircraft Research Laboratories  
 High Temperature Materials Research  
 400 Main Street  
 East Hartford, Connecticut 06108  
 Dr. Michael A. DeCrescente  
 N. Bornstein  
 Programs:  
 1. Sulfidation mechanisms  
 2. Mechanism of vanadium accelerated corrosion  
 3. High temperature oxidation
173. United States Steel Corporation  
 Applied Research Laboratory MS-16  
 P.O. Box 38  
 Monroeville, Pennsylvania 15146  
 Dr. W. E. Boggs (412) 372-1212  
 Dr. E. H. Phelps  
 Programs:  
 1. Investigation of the reactions between hot sulfur-containing gases and iron base alloys (current)  
 2. The modification and inhibition of oxide formed on steel in slab reheat furnaces (current)  
 3. Effects of alloying elements on the formation of protective oxide films on heat resistant steels (terminated 1970)  
 4. Evaluation of high-temperature oxidation performance of ferrous alloys  
 5. Development of coatings for oxidation resistance
174. United States Steel Corporation  
 Physical Chemistry Section  
 Edgar C. Bain Laboratory for Fundamental Research  
 Research Center  
 Monroeville, Pennsylvania 15146

175. Prof. Edward W. Pickering (412) 331-3100  
Programs:  
1. Transition from internal to external oxidation in binary and ternary alloys  
2. Preferential attack of one component of binary alloys by an aggressive gas
176. University of California at Los Angeles  
Materials Department  
6551 Boelter Hall  
Los Angeles, California 90024  
Prof. D. L. Douglass (213) 825-1622  
Programs:  
1. Zirconium oxidation mechanism  
2. Role of oxide plasticity on oxidation  
3. Influence of rare earth metals on oxidation  
4. Resistance of Ni-20Cr and Ni<sub>3</sub>Al
176. Vanderbilt University  
Dept. of Materials Science and Metallurgical Eng.  
Nashville, Tenn. 37203  
Prof. B. D. Lichter (613) 322-2415  
Programs:  
1. Hot corrosion mechanisms in Ni-Cr alloys and superalloys  
2. Effect of rare-earth oxide additions on hot corrosion of Ni-Cr alloys
177. Westinghouse Electric Corp.  
Astronuclear Laboratory  
Metals Science Section  
P.O. Box 10804  
Pittsburgh, Pennsylvania 15236  
Dr. R. C. Svedberg (412) 892-5600
- Programs:  
1. Investigation of the possibility of modifying the defect structure of parent oxides to enhance oxidation protection (NASC No. N00019-70-C-0148) (current)  
2. Reactivity of some vanadium alloys with the interstitials oxygen, nitrogen, and carbon at low partial pressures (AEC Contract AT(30-1)-3791 (completed))  
3. Evaluation of mechanical properties, oxidation resistance and structure of slurry-silicide coated T-222 (NASA-CR-72713) Contract No. NAS3-12410 (completed)  
4. Development of ductile oxidation resistant columbium alloy (AFML-TR-69-64) Contract No. AF33615-67-C-1689 (completed)
178. Westinghouse Electric Corporation  
Westinghouse Research Laboratories  
Churchill Borough  
Pittsburgh, Pennsylvania 15235  
Dr. Earl A. Gulbransen (412) 256-3475 or 3482  
Programs:  
1. Vaporization chemistry in the oxidation of Cr, Si, Mo and Cb  
2. Thermochemistry and the high temperature oxidation of Si and SiC  
3. Thermochemistry and the reaction of metals with S and O gases  
4. High temperature oxidation of refractory metals  
5. Thermochemistry and the combustion of aluminum and zirconium

TABLE 2. CATEGORY INDEX

Category*	Code*	Organization (Number from Table 1)	Total
Thermodynamics, phase diagrams, reaction equilibria	1.1	1,3,5,6,13,14,19,20,22,26,27,31,32,37,39,41,42,43,44,49,53,54,60,61,65,66,67,69,70,74,82,83,84,85,92,94,95,97,99,100,102,106,107,119,124,129,130,135,147,152,155,156,159,167,168,171,172,173,174,175,178	61
Electrochemical problems	1.2	1,14,20,23,28,43,50,54,58,59,60,61,67,69,70,73,74,85,94,97,102,115,118,145	24
Reaction kinetics and diffusion processes	1.3	2,3,5,6,9,10,11,13,14,15,17,19,21,26,28,30,31,32,37,38,39,40,41,42,43,44,48,49,51,53,54,57,58,59,60,61,66,67,68,69,73,79,80,83,84,85,90,92,94,97,98,99,100,102,105,106,107,108,112,113,114,117,118,119,121,122,124,125,127,130,133,135,140,141,142,144,147,149,150,152,153,154,155,156,158,159,161,162,165,167,171,172,173,174,175,177,178	97
Aerodynamic factors (mechanism of deposition)	1.4	97,146,148,152	4
Rheological investigations (viscosity of the melts)	1.5	48,57,97	3
Development of corrosion-resistant materials	2.1	2,18,22,24,32,36,47,52,53,61,62,65,70,74,85,87,88,91,92,94,97,100,101,102,103,104,106,107,111,119,124,128,134,136,137,142,143,146,148,155,176,177	42
Surface protection of materials	2.2	5,6,7,8,15,16,19,22,24,27,29,30,32,33,34,35,40,49,51,56,57,61,63,64,66,68,70,74,75,85,90,94,97,107,108,114,115,116,118,119,120,121,124,131,132,136,138,139,142,143,146,151,152,163,164,166,168,169,171,177	60
Material Behavior under corrosion	2.3	2,3,4,5,6,8,11,12,13,14,15,16,17,19,22,24,25,33,39,40,45,46,47,49,50,51,52,53,54,55,56,57,58,59,61,62,63,64,65,66,69,70,71,72,74,75,76,77,78,81,82,83,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,101,102,103,104,106,107,108,109,110,111,112,114,115,116,117,118,119,120,121,123,124,126,127,128,131,137,138,139,140,141,143,144,146,150,151,152,154,155,157,159,160,161,162,163,164,166,170,171,174,175,176,177	119
Additives	3.1	48,49,53,64,69,71,75,82,86,87,88,89,109,114,115,118,139,163	18
Surface treatment of pipes, supports, and other parts of furnaces, boilers,, turbines, etc. exposed to high temperatures	3.4	2,7,49,53,56,72,75,86,87,88,89,97,110,114,118	15

\*The categories and code numbers were selected to conform to those of the European Federation of Corrosion survey.

TABLE 3. NAME INDEX

Ahlborn, H. Battelle-Institut e.V. (47)	Bohnenkamp, Max-Planck-Institut für Eisenforschung (59)
Allen, Dr. R.E. General Electric Co. (142)	Boone, Dr. D.H. Pratt & Whitney Aircraft (164)
Antill, Dr. J.L. Atomic Energy Research Establishment (92)	Bornstein, N. United Aircraft Research Lab. (172)
Ashley, International Combustion Ltd. (103)	Boselli, B. Ansaldo Meccanico Nucleare (73)
Baatz, Technischer Überwachungsverein Essen e.V. (64)	Brabers, Dr. M.J. Katholieke Universiteit Leuven (6)
Baccaredda, M. Università di Pisa (80)	Bruch, J. Edelstahlwerk Witten AG (52)
Bando, G. Centro Sperimentale Metallurgico S.p.A. sede legale (74)	Brinnetaud, SNECMA (33)
Bardolle, J. Université d'Orléans (41)	Buckle, H. Office National d'Etudes et de Recherches (32)
Barret, P. Laboratoire de Recherche sur la Réactivité des Solides associé au CNRS (31)	Bungardt, Dr. K. Deutsche Edelstahlwerke AG (51)
Bartlett, E.S. Battelle Columbus Laboratories (124)	Burwood-Smith, A. National Gas Turbine Establishment (111)
Bartlett, Prof. R.W. Stanford University (168)	Buskens, H. Babcock-Werke (46)
Baumann, Technischer Überwachungsverein Bayern e.V. (63)	Caplan, Donald National Research Council of Canada (14)
Belin, P. Université de Tours (44)	Casteels, F. Centre D'Etude de L'énergie Nucléaire (9)
Beltran, E.J. General Electric Co. (138)	Condé, J.F.G. Admiralty Materials Laboratory (90)
Benard, J. Ecole Nationale Supérieure de Chimie de Paris (27) (42)	Coutsouradis, D. Centre de Recherches Métallurgiques (2)
Beranger, G. Centre de Recherches Métallurgiques de l'Ecole des Mines (23)	Cowley, W.E. Associated Octel Co. Ltd. (91)
Berkowitz, Dr. Joan B. A.D. Little, Inc. (145)	Cox, B. Atomic Energy of Canada, Ltd. (10)
Besson, Ecole Nationale Supérieure Electrochimie et Electrometallurgie (28)	Cubicciotti, Dr. Daniel D. Stanford Research Institute (167)
Birchenall, Prof. C.E. University of Delaware (133)	Darras, R. Centre d'Etudes Nucléaires de Saclay (21)
Birks, Dr. N. University of Sheffield (117)	Davin, A. Centre National de Recherches Métallurgiques (2)
Boggs, Dr. W.E. U.S. Steel Corp. (173)	DeCrescente, Dr. Michael A. United Aircraft Research Lab. (172)
	Detfet, L. Institut Belge des Hautes Pressions (4)

- Devereux, Dr. O.F.  
University of Connecticut (130)
- Dewey, M.A.P.  
Fulmer Research Institute Ltd. (100)
- Doering, Harvey von E.  
General Electric Co. (139)
- Douglass, Prof. D.L.  
University of California at Los Angeles (175)
- Dreschler,  
Université de Marseille (39)
- Edwards, A.M.  
British Steel Corp. (95)
- Elshout, A.J.  
N.V. tot keuring van Electrotechnische Materialien (82)
- Engell, Dr. H.J.  
Max-Planck-Institut für Metallforschung (61)
- Ergang, R.  
International Nickel Deutschland GmbH (55)
- Evans, D.S.  
Hirst Research Centre, G.E.C. Ltd. (102)
- Ferre,  
SNECMA (33)
- Fitzer, Dr. E.  
Universität Karlsruhe (68)
- Fountain, M.  
N.W. Region C.E.G.B. (115)
- Foster, G.G.  
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- Frantes, F.W.  
Stahlwerke Südwestfalen AG (62)
- Freeman, Dr. W.R. (Jr.)  
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- Fries, Dr. R.J.  
Los Alamos Scientific Laboratory (147)
- Galmiche, P.  
Office National d'Etudes et de Recherches (32)
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Universität Bonn (66)
- Gellins, P.J.  
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- Gerdeman, Dr. Dennis  
University of Dayton (132)
- Givord, J.P.  
Société Ugine-Kuhlmann (35)
- Glaverbel, S.A.  
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- Goodison, D.  
Nuclear Design and Construction Ltd (114)
- Goward, Dr. G.W.  
Pratt & Whitney Aircraft (164)
- Grabke, H.J.  
Max-Planck-Institut für Metallforschung (610)
- Grace, Prof. Richard E.  
Purdue University (165)
- Graham, Dr. H.C.  
Aerospace Research Laboratories (119)
- Greene, Prof. N.D.  
University of Connecticut (130)
- Gregoire,  
Ecole Centrale des Arts et Manufactures (25)
- Grisaffee, Salvatore J.  
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- Grönlund, N.F.  
Universität von Kopenhagen (20)
- Gulbransen, Dr. Earl A.  
Westinghouse Electric Corp. (178)
- Habraken, L.  
Centre de Recherches Metallurgiques (2)
- Hagel, Dr. William C.  
General Electric Co. (141)
- Hall, D.W.  
Rolls Royce Ltd. (116)
- Halstead, W.D.  
Central Electricity Research Lab., C.E.G.B. (97)
- Hancock, Dr. P.  
Cranfield Institute of Technology (99)
- Hart, A.B.  
Central Electricity Research Lab., C.E.G.B. (97)
- Hermann,  
Technischer Überwachungsverein Essen e.V. (64)
- Heslop, Dr. J.  
Henry Wiggin & Co. Ltd. (101)
- Hestermans, P.  
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- Heumann, Th.  
Universität Munster (69)
- Hill, Dr. V.L.  
IIT Research Institute (143)

- Hivert, A.  
Office National d'Etudes et de Recherches (32)
- Holmes, D.R.  
Central Electricity Research Lab., C.E.G.B. (97)
- Lackson, P.J.  
Marchwood Eng. Lab., C.E.G.B. (109)
- Tatfee, Dr. R.I.  
Battelle Columbus Laboratories (124)
- Jahn, H.  
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- Jelgersma, J.H.N.  
N.V. tot keuring van Electrotechnische Materialien (82)
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Berkeley Nuclear Lab., C.E.G.B. (94)
- Jones, D. de G.  
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- Kaufman, Dr. M.  
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- Kirsch, H.  
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- Korstad, P.  
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- Kohler, K.  
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- Kranz, E.  
Thyssen Röhrenwerke AG (65)
- Kruger, Dr. J.  
National Bureau of Standards (153)
- Kvernes, J.  
Sentralinstitutt for Industriell Forskning (85)
- Lacombe, P.  
Centre de Recherches Metallurgiques de l'Ecole des Mines (23)
- Lafitte, M.  
Université de Marseille (39)
- Landsberg, Dr. Arne  
Bureau of Mines (127)
- Legendre, P.  
Centre de Recherches de la Société Métallurgique d'Imphy (24)
- Lehr, P.  
Centre National de la Recherche Scientifique (22)
- Fennartz, Dr. G.  
Deutsche Edelstahlwerke AG (51)
- Lewis, Henry  
International Nickel Ltd. (104)
- Lichter, Prof. B.D.  
Vanderbilt University (175)
- Llewellyn, G.  
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- Lloyd, G.O.  
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- Lopez, L.A.  
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- Mahorter, Robert G.  
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- Mailhos, M.  
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- Manenc, J.  
Institut de Recherches de la Sidérurgie (30)
- Marion, F.  
Université d'Amiens (37)
- Maxwell, D.  
University of Newcastle-Upon-Tyne (113)
- Menzies, Ian A.  
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- Molinier,  
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- Möller, H.  
Brown, Boveri & Cie. (49)
- Möller, W.  
Forschungsvereinigung Verbrennungskraftmaschinen (53)
- Morris, Dr. L.A.  
Falconbridge Nickel Mines, Ltd. (12)
- Myers, Dr. James R.  
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- Neuhaus, A.  
Universität Bonn (66)
- Nicholson, A.  
British Steel Corp. (95)
- Norris, L.F.  
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- Oden, Dr. L.L.  
Bureau of Mines (127)
- Ortega, M.R.  
Celulosas De Heulva (86)

- Oudar, J.  
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(42)
- Packer, C.M.  
Lockheed Missiles & Space Co. (146)
- Paidassi, J.  
Centre d'Etudes Nucléaires de Saclay (21)
- Paton, Dr. Neil  
North American Rockwell Corp. (157)
- Paul, W.  
Orenda Limited (16)
- Peck, Dr. J.V.  
TRW, Inc. (171)
- Perkins, R.A.  
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- Phelps, Dr. E.H.  
U.S. Steel Corp. (173)
- Pichoir, R.  
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- Pickering, Dr. Howard W.  
U.S. Steel Corp. (174)
- Pollmann, S.  
L.u.C. Steinmüller GmbH (57)
- Pourbaix, A.  
Belgian Center for Corrosion Study, CEBELCOR (1)
- Pourbaix, M.  
Belgian Center for Corrosion Study, CEBELCOR (1)  
also Université Libre de Bruxelles
- Probst, Dr. H.B.  
NASA-Lewis (152)
- Pryor, Dr. M.J.  
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